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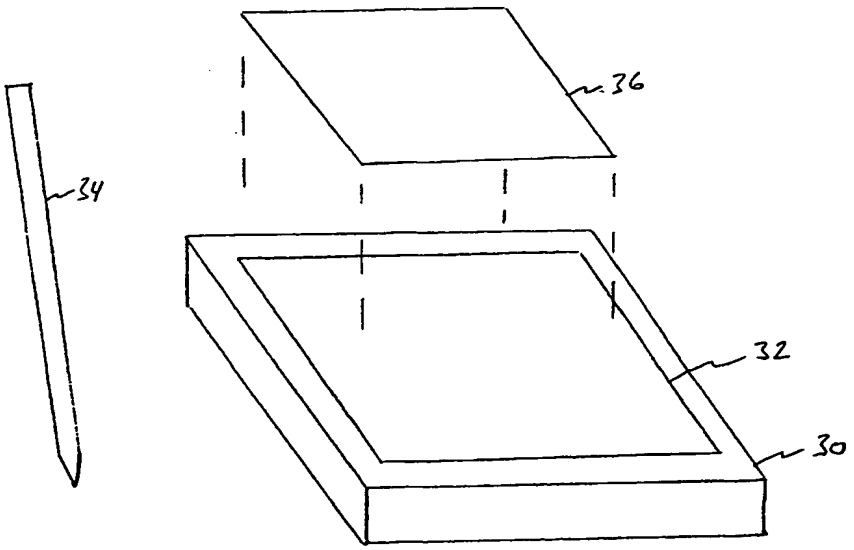
[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR PROVIDING VISUAL FEEDBACK WHEN RECORDING A SIGNATURE



(57) Abstract: A system and method for providing visual feedback to the user when providing an electronic signature, typically at a point of purchase, so that the writer can provide an electronic signature which appears the same as a non-electronic signature, wherein the method provides a carbonless paper (36) which is secured by any convenient means to the touchpad surface (32), and wherein the carbonless paper provides visual feedback to the writer when pressure is applied to the paper as the writer signs a name on the carbonless paper covered touchpad surface.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SYSTEM AND METHOD FOR PROVIDING VISUAL FEEDBACK WHEN RECORDING A SIGNATURE

BACKGROUND

1. The Field Of The Invention.

This invention relates generally to digitally stored signatures. Specifically, the invention is a system and apparatus for improving the process of recording a signature that is to be stored digitally. This is accomplished by providing visual feedback to the writer as the signature is being written, and it is a system and method for preserving a hard copy of the digitally stored signature without having to print it.

2. State of the Art

The state of the art of digitally recording a handwritten signature is in its infancy. This is largely to blame on the inherent difficulty of writing without seeing what is being written.

For example, consider a clip-board like digital signature recording device 10 that is often used in the delivery industry as shown in Figure 1. The digital

signature recording device 10 typically includes a pressure sensitive area 12. A user is supposed to use a stylus 14, and write a signature within the pressure sensitive area 12. The signature is typically recorded within a memory of the digital signature recording device 10 so that it can be stored for later retrieval by printing the signatures, or transferring them to a hard drive, tape or other more permanent means of recording.

Figure 2 illustrates another situation in which recording a signature in a digital format is becoming ubiquitous. Specifically, many merchants now require a user to sign a credit card invoice 20 after slipping the invoice on top of a digitizing pad 22. Specifically, a pressure sensitive area 24 is provided on the digitizing pad 22 where the user signs a signature with a pen 26. The pen is an inking device which leaves a visible signature on the credit card invoice 20, and the pressure sensitive area 24 beneath digitizes and stores the signature.

It should be realized that as computers, the Internet and digital technology in general become more integral to business and even home life, the desire to

record a personal signature will likely become more important. This is especially true when e-commerce transactions are taking place without a customer meeting with a cashier. It is also likely that the technology for digitizing signatures is likely to improve, thus making providing a signature an option that will be desired by merchants and credit card companies alike to prevent fraud.

Given that there are existing reasons for recording a signature in a digital format, and that the reasons for recording signatures is likely to grow, several problems have become apparent.

One of the worst drawbacks of the system shown in figure 1 is that the user does not see the signature as it is being written in the pressure sensitive area 12. It most likely takes the experience of writing without seeing what you are actually drawing to understand how uncomfortable and difficult this task can be. Even people who typically write very legible signatures will skew their own signature when they cannot see while writing.

It might seem that providing a pen with digitizing tablets must be the obvious solution. Unfortunately, this solution will not work for many reasons. For example, it is observed that not all digitizing pads or tablets are pressure sensitive. Accordingly, a regular pen will not work with all digitizing tablets. In addition, the pressure of a pen or pencil tip can damage many pressure sensitive digitizing tablets.

What is needed is a system for providing visual feedback to a person writing a signature. This system should work with any type of pad or tablet that can digitize a written information. It would be advantageous if the visual feedback would be provided regardless of the type of stylus that is being used, even if the stylus did not have an inking cartridge.

OBJECT AND SUMMARY OF THE INVENTION

It is an object of the present invention to provide a system and method for providing visual feedback to a user who is writing information, wherein that information needs to be recorded in a digital format.

It is another object to provide the system and method which will work on any type of pad tablet or touchpad that can digitize written information.

It is another object to provide the system and method which will work with any type of stylus.

It is another object to provide the system and method which does not require an inking stylus to function.

It is another object to provide the system and method which will work using a variety of different types of carbonless paper.

It is another object to provide the system and method which enables the writer to use a blank carbonless paper, or one which has pre-printed material such as the outline of a form disposed thereon.

It is another object to provide the system and method which utilizes carbonless paper which also has an adhesive on a back thereof to cause the carbonless paper to adhere to the touchpad surface while writing.

It is another object to provide the system and method which will function using a carbonless paper which can be secured to the touchpad using clips, brackets,

vacuum-assist, electro-static force, adhesive on the touchpad surface, or an overlay with selective openings.

The above objects are realized in a specific illustrative embodiment of a system and method for providing visual feedback to the user when writing information that is to be digitally recorded, typically at a point of purchase, so that the writer can provide a signature that will generally appear to be the same as a signature that is not being digitized.

In a first aspect of the invention, carbonless paper is provided for the user to write a signature, where the signature is written on top of a touch-sensitive surface of a touchpad, a digitizing tablet or a digitizing pad.

In a second aspect of the invention, a non-inking stylus can be used with the carbonless paper because it will provide the desired visual feedback. The non-inking stylus eliminates the cost of providing an expensive inking stylus.

In a third aspect of the invention, an inking stylus can also be used, with or without the carbonless paper.

In a fourth aspect of the invention, a larger variety of touchpads and styluses can be used because the

stylus does not have to be the inking variety. Instead, the carbonless paper gives visual feedback to the writer who can use any type of stylus and touchpad because the system operates on the principle of applied pressure on the carbonless paper.

In a fifth aspect of the invention, an adhesive or other means of temporarily securing the carbonless paper while information is being written is provided.

These and other objects, features, advantages and alternative aspects of the present invention will become apparent to those skilled in the art from a consideration of the following detailed description taken in combination with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective elevational view of a tablet having a pressure sensitive digitizing area that does not provide visual feedback to the user while a signature is written.

Figure 2 is a perspective elevational view of a digitizing pad for recording signatures made on a credit card invoice.

Figure 3 is perspective elevational view of the presently preferred embodiment that is made in accordance with the principles of invention.

Figure 4 is side profile elevational view of an alternative embodiment of the present invention.

Figure 5 is a block diagram of the elements of a touchpad that is utilized in the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made to the drawings in which the various elements of the present invention will be given numerical designations and in which the invention will be discussed so as to enable one skilled in the art to make and use the invention. It is to be understood that the following description is only exemplary of the principles of the present invention, and should not be viewed as narrowing the claims which follow.

The present invention provides a system for giving a user visual feedback when writing information that is to be digitally recorded, and yet will work with an inking or a non-inking stylus. But what should be remembered is

that while the system requires pressure to be applied by the user who is writing information, the digitizing technology does not have to be pressure sensitive.

Accordingly, the presently preferred embodiment of the invention is a combination of three elements as shown in figure 3. The first element is a touchpad 30 or other device that is capable of digitizing information that is applied to a touch-sensitive surface 32. The second element is a non-inking stylus 34. And finally, the third element is carbonless paper 36. Carbonless paper is paper on which a visible mark appears wherever an object makes a contact therewith, such as from a point of a stylus. For example, it is often used to make duplicate checks. The writing on a check above makes a clearly distinguishable impression on the carbonless paper below.

The preferred embodiment operates on the principle of the stylus 34 applying pressure on a touch-sensitive surface 32. Because this principle of operation is universal to most if not all varieties of touchpads, digitizing tablets and non-inking styluses, the present invention eliminates the need to provide a stylus with an

inking cartridge. Such a modification to a stylus can raise the cost substantially. Furthermore, using an inking stylus will inevitably lead to the touchpad surface becoming dirty and perhaps permanently marked with ink.

Accordingly, the present invention eliminates the need for an inking cartridge by using the carbonless paper 36 that can be secured by any convenient means to the touchpad 30.

A first important observation is that the touchpad 30 can use any type of sensing technology. For example, this means that the touchpad can use capacitance sensing, electromagnetic, inductive, pressure sensing, electrostatic, ultrasonic, optical, resistive membrane, semi-conductive membrane or other finger or stylus-responsive technology. All that is important is that the user must need to apply pressure to the touch-sensitive surface in order for the touchpad to receive input. As long as the user must apply pressure, the present invention provides visual feedback.

The visual feedback is provided in the form of the carbonless paper 36. Carbonless paper 36 produces a

visible indication of where pressure is applied. Therefore, regardless of what type of information is being written, it will appear on the carbonless paper 36.

The carbonless paper 36 can be provided in the form of a receipt, an invoice, a form, or even as a blank sheet. However, it is important that the carbonless paper 36 not move while the user is writing. Even though the information on the carbonless paper 36 will look correct, the digitized recording might show information written on top of other information. Therefore, it is another aspect of the invention that a means be provided for securing the carbonless paper 36 while information is written thereon.

For example, a very light adhesive might be applied to an underside of the carbonless paper 36. The light adhesive might have nothing more than a tacky feeling, such as is found on sticky notes that are ubiquitous in offices. The adhesive can be along the entire backside of the carbonless paper 36, or be used in just a few locations such as along an edge or at the corners.

Figure 4 shows in a profile view that another option is to provide some sort of clip 40 or bracket along an

edge of a touchpad 42. The clip 40 might be nothing more than a clip that is found on common clipboards. The clip would most likely not make contact with a touch-sensitive surface 44, but instead be disposed above it so as not to interfere with the information being recorded in digital format.

The stylus 34 of the present invention can operate in many different ways. Essentially, what is important is that the stylus function with the type of touch-sensitive technology that the touchpad is using. Thus, the present invention will work with any type of stylus. As a means of reducing costs of the system, the stylus can be the non-inking variety because carbonless paper 36 is preferred. Nevertheless, the present invention will still function with an inking stylus, even if carbonless paper 36 is being used. It should be noted that the stylus can be the type that must be tethered to the touchpad to function.

The touchpad 30 of the present invention must also have the capability of digitizing information. Thus, it is not enough that the touchpad can function as an input device to a computer. It must be capable of digitizing

information that is disposed on the touch-sensitive surface. The touchpad must also have input regarding a time to begin and end recording of the information to be digitized. This feature is available in many existing touchpad system. For example, the Cirque Corporation CRUISE CAT(TM) or the INDELeLINK INDELePAD(TM). These touchpads are capable of recognizing gestures. This gesture recording technology is easily adapted to recording information beginning at a designated time period, and ending at a designated time period. For the sake of comparison, it is noted that an example of digitizer tablet technology that could be used is a Super Pen Tablet, model SP3333 from UC-LOGIC.

Alternative embodiments of the invention include such things as the different types of carbonless paper and pressure sensitive paper that are available. For example, some carbonless paper is a single sheet. Other carbonless paper consists of two sheets, and it is the interaction between them that results in one of the sheets showing an imprint of a stylus thereon.

It was mentioned previously that the stylus can be inking or non-inking. The stylus can also be an active

device or a passive device. For example, an inductive stylus, radio frequency (RF) stylus, infra red (IR) stylus, and sonic stylus are all active devices.

Attaching the carbonless paper to the touchpad surface has previously been described as using a light adhesive or a clip. Other means of temporary attachment include vacuum assist, electro-static force, or an adhesive surface on the touchpad rather than on the carbonless paper. Another possibility is the use of a plastic overlay. The paper is inserted between the plastic overlay and the touch-sensitive surface of the touchpad. The stylus makes contact with the plastic overlay while the paper is held in place. The plastic overlay would have holes in it where the stylus would make direct contact with the paper.

The carbonless paper has previously been described as being a single or double sheet. However, the carbonless paper can also come in a roll such as is common for adding machines.

Another feature of the present invention is the ability to manage the digitized data once it is recorded. For example, it may be necessary to at least temporarily

store the digitized data. Thus, figure 5 illustrates the concept that the touchpad 50 can include non-volatile memory, RAM, or even a hard drive as memory 52. However, it may be desirable to transfer the data to another device for long term storage or evaluation. Therefore, the touchpad can also include a communication port 54 to link it to another device. The communication port 54 might just be a wire to a computer, or be a wireless link such as is provided by infra-red or radio frequency technology. Furthermore, even if the digitized data is eventually transferred to another location, the touchpad might have to at least temporarily store the digitized data until transfer can take place. Thus, the touchpad can include the memory and a communication port. It is understood that the sensing technology 56 and the digitizing technology 58 are a part of the touchpad 50.

It is to be understood that the above-described arrangements are only illustrative of the application of the principles of the present invention. Numerous modifications and alternative arrangements may be devised by those skilled in the art without departing from the spirit and scope of the present invention. The appended

claims are intended to cover such modifications and arrangements.

CLAIMS

What is claimed is:

1. A system for providing visual feedback when writing data that is recorded in a digital format, said system comprising:

a digitizing device that includes a surface that is responsive to an input device;

a stylus whose movement is detectable on the surface of the digitizing device; and

at least one sheet of carbonless paper, wherein at least a portion of the at least one sheet of carbonless paper is disposed on the surface in a writing area, wherein the stylus enters data by making contact with the carbonless paper in the writing area, and wherein the data is digitized by the digitizing device.

2. The system as defined in claim 1 wherein the digitizing device further comprises a memory for recording the digitized data.

3. The system as defined in claim 1 wherein the system

further comprises a communication port to thereby enable the digitized data to be transferred to another location.

4. The system as defined in claim 3 wherein the communication port can include wire and wireless technology to accomplish the transfer of the digitized data.

5. The system as defined in claim 1 wherein the surface of the digitizing device is selected from the group of surface sensing technologies consisting of capacitance, electromagnetic, inductive, pressure, electrostatic, ultrasonic, optical, resistive membrane, and semi-conductive membrane sensing technologies.

6. The system as defined in claim 1 wherein the stylus is comprised of a non-inking stylus that is detectable by the responsive surface of the digitizing device.

7. The system as defined in claim 1 wherein the stylus is selected from the group of styluses consisting of active and passive styluses.

8. The system as defined in claim 7 wherein the active styluses are selected from the group of active styluses consisting of inductive, radio frequency (RF), infra-red, and sonic styluses.

9. The system as defined in claim 1 wherein the system further comprises a means for temporarily holding the at least one sheet of carbonless paper on the responsive surface of the digitizing device.

10. The system as defined in claim 9 wherein the means for temporarily holding the at least one sheet of carbonless paper on the responsive surface of the digitizing device is selected from the group of means consisting of slots, brackets, clips, vacuum-assists, electrostatic forces, overlays, and adhesives.

11. The system as defined in claim 10 wherein the overlay further comprises at least one hole therethrough to thereby enable a stylus to make direct contact with the at least one sheet of carbonless paper to thereby make a visible impression thereon.

12. The system as defined in claim 1 wherein the at least one sheet of carbonless paper is further comprised of a form with at least one predefined area where a stylus is to make contact and provide desired information.

13. The system as defined in claim 1 wherein the carbonless paper is further comprised of a plurality of sheets, wherein an interaction between the plurality of sheets of carbonless paper results in a visible impression on at least one of the plurality of sheets.

14. The system as defined in claim 1 wherein the at least one sheet of carbonless paper is further comprised of a roll of carbonless paper, such that the carbonless paper can be pulled from the roll and removed therefrom in desired increments.

15. The system as defined in claim 1 wherein the at least one sheet of carbonless paper is further comprised of an adhesive which enables the at least one sheet of

carbonless paper to adhere to the responsive surface of the digitizing device.

16. The system as defined in claim 15 wherein the at least one sheet of carbonless paper is further comprised of the adhesive which is disposed thereon in selected locations.

17. A method for receiving visual feedback when writing on a digitizing device that can record the writing thereon, wherein the method comprises the steps of:

(1) providing the digitizing device that includes a surface that is responsive to an input device, a stylus whose movement is detectable on the responsive surface, and at least one sheet of carbonless paper, wherein at least a portion of the at least one sheet of carbonless paper is disposed on the responsive surface in a writing area; and

(2) writing on the at least one sheet of carbonless paper in the writing area using the stylus while the writing is recorded.

18. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper regardless of a sensing technology utilized by the digitizing device.

19. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper regardless of a type of stylus technology utilized in the stylus.

20. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper without damaging the responsive surface by utilizing a non-inking stylus.

21. The method as defined in claim 17 wherein the method further comprises the step of utilizing the digitizing device to also provide input to a computer that is

coupled thereto, wherein the input at least comprises cursor control.

22. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper while avoiding the expense of utilizing an inking stylus.

23. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper without having to risk writing with ink on the responsive surface.

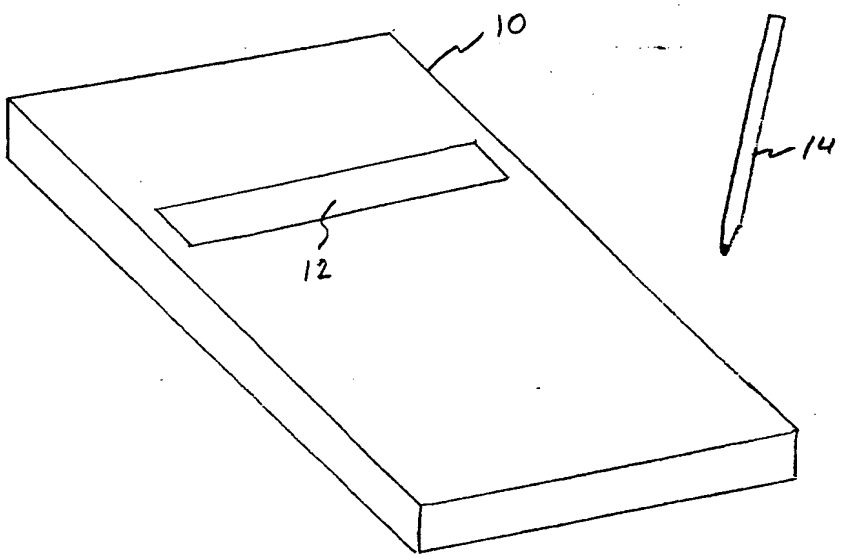

FIGURE 1
(PRIOR ART)

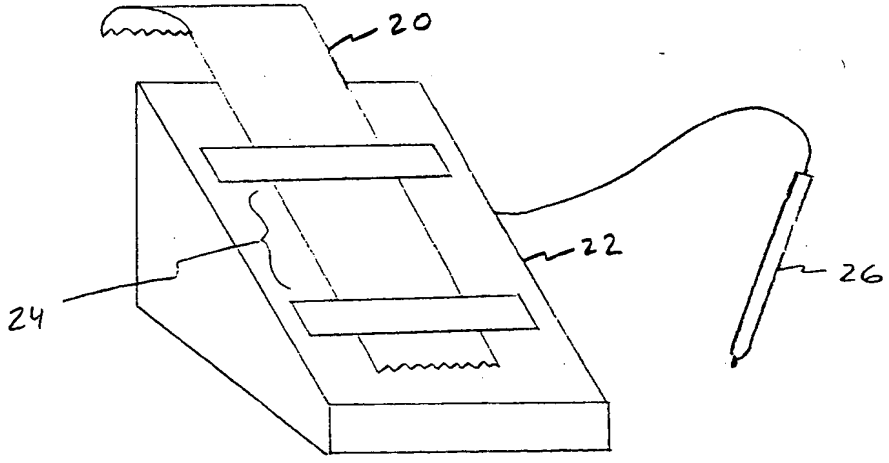

FIGURE 2
(PRIOR ART)

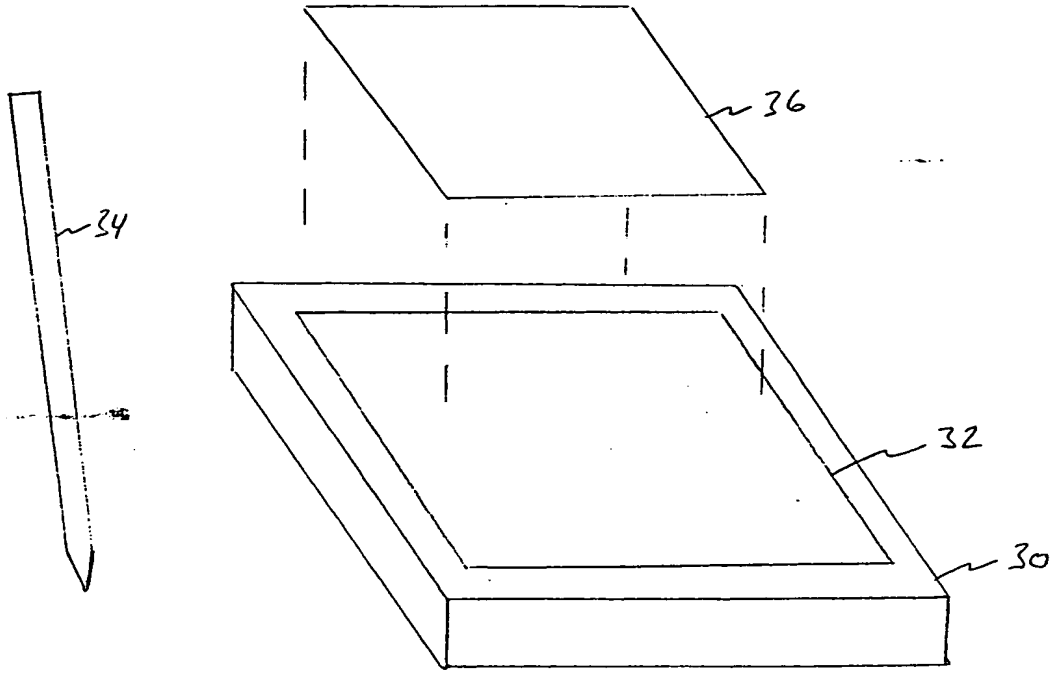

FIGURE 3

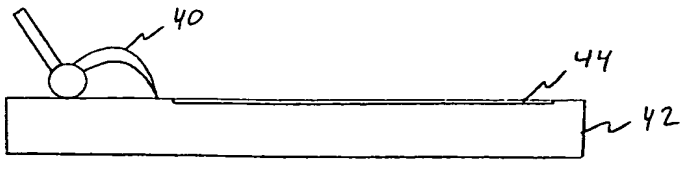

FIGURE 4

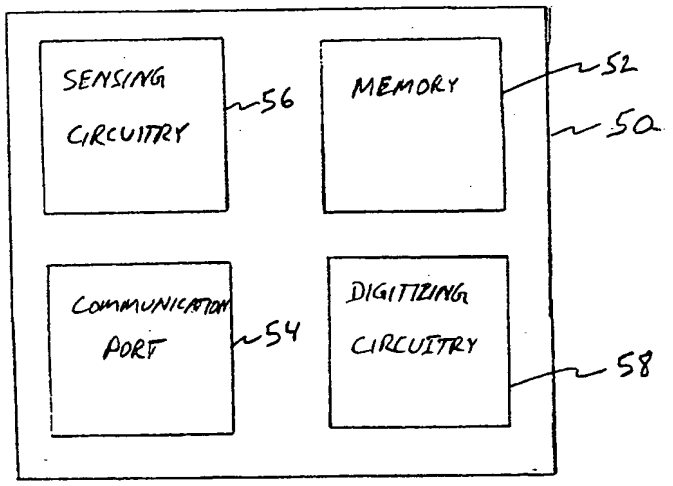

FIGURE 5

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : G06K 9/22, 9/00, 5/00
US CL : 382/313, 119; 235/380
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S. : 382/313, 314, 315, 119; 235/380, 472; 283/60.1, 60.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST (USPAT, USOCR, EPO, JPO, Derwent)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,561,282 A [PRICE et al] 01 October 1996, abstract, Figs. 1, 2A, 8, col. 12, line 44 to col. 13, line 65, col. 18, lines 33-45, col. 19, lines 19-44, col. 30, lines 8-23.	1-23
Y	US 5,819,665 A [MCCORMICK] 13 October 1998, col. 4, line 66 to col. 5, line 15, col. 6. lines 12-28.	1-23
Y	US 5,756,187 A [KUO et al] 26 May 1998, col. 3, lines 19-41, col. 4, lines 1-6.	15-16
Y	US 4,318,096 A [THORNBURG et al] 02 March 1982, col. 1, lines 8-23.	21
Y	US 4,005,878 A [VAN LEER] 01 February 1977, col. 3, lines 59-68.	1-23

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance
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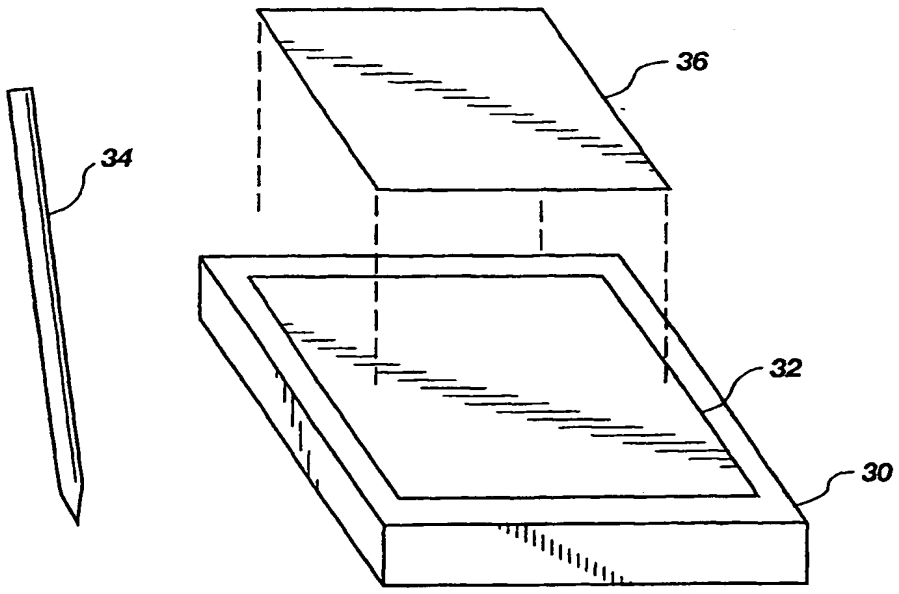
(54) Title: SYSTEM AND METHOD FOR PROVIDING VISUAL FEEDBACK WHEN RECORDING A SIGNATURE



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BACKGROUND

1. The Field Of The Invention.

This invention relates generally to digitally stored signatures. Specifically, the invention is a system and apparatus for improving the process of recording a signature that is to be stored digitally. This is accomplished by providing visual feedback to the writer as the signature is being written, and it is a system and method for preserving a hard copy of the digitally stored signature without having to print it.

2. State of the Art

The state of the art of digitally recording a handwritten signature is in its infancy. This is largely to blame on the inherent difficulty of writing without seeing what is being written.

For example, consider a clip-board like digital signature recording device 10 that is often used in the delivery industry as shown in Figure 1. The digital

signature recording device 10 typically includes a pressure sensitive area 12. A user is supposed to use a stylus 14, and write a signature within the pressure sensitive area 12. The signature is typically recorded within a memory of the digital signature recording device 10 so that it can be stored for later retrieval by printing the signatures, or transferring them to a hard drive, tape or other more permanent means of recording.

Figure 2 illustrates another situation in which recording a signature in a digital format is becoming ubiquitous. Specifically, many merchants now require a user to sign a credit card invoice 20 after slipping the invoice on top of a digitizing pad 22. Specifically, a pressure sensitive area 24 is provided on the digitizing pad 22 where the user signs a signature with a pen 26. The pen is an inking device which leaves a visible signature on the credit card invoice 20, and the pressure sensitive area 24 beneath digitizes and stores the signature.

It should be realized that as computers, the Internet and digital technology in general become more integral to business and even home life, the desire to

record a personal signature will likely become more important. This is especially true when e-commerce transactions are taking place without a customer meeting with a cashier. It is also likely that the technology for digitizing signatures is likely to improve, thus making providing a signature an option that will be desired by merchants and credit card companies alike to prevent fraud.

Given that there are existing reasons for recording a signature in a digital format, and that the reasons for recording signatures is likely to grow, several problems have become apparent.

One of the worst drawbacks of the system shown in figure 1 is that the user does not see the signature as it is being written in the pressure sensitive area 12. It most likely takes the experience of writing without seeing what you are actually drawing to understand how uncomfortable and difficult this task can be. Even people who typically write very legible signatures will skew their own signature when they cannot see while writing.

It might seem that providing a pen with digitizing tablets must be the obvious solution. Unfortunately, this solution will not work for many reasons. For example, it is observed that not all digitizing pads or tablets are pressure sensitive. Accordingly, a regular pen will not work with all digitizing tablets. In addition, the pressure of a pen or pencil tip can damage many pressure sensitive digitizing tablets.

What is needed is a system for providing visual feedback to a person writing a signature. This system should work with any type of pad or tablet that can digitize a written information. It would be advantageous if the visual feedback would be provided regardless of the type of stylus that is being used, even if the stylus did not have an inking cartridge.

OBJECT AND SUMMARY OF THE INVENTION

It is an object of the present invention to provide a system and method for providing visual feedback to a user who is writing information, wherein that information needs to be recorded in a digital format.

It is another object to provide the system and method which will work on any type of pad tablet or touchpad that can digitize written information.

It is another object to provide the system and method which will work with any type of stylus.

It is another object to provide the system and method which does not require an inking stylus to function.

It is another object to provide the system and method which will work using a variety of different types of carbonless paper.

It is another object to provide the system and method which enables the writer to use a blank carbonless paper, or one which has pre-printed material such as the outline of a form disposed thereon.

It is another object to provide the system and method which utilizes carbonless paper which also has an adhesive on a back thereof to cause the carbonless paper to adhere to the touchpad surface while writing.

It is another object to provide the system and method which will function using a carbonless paper which can be secured to the touchpad using clips, brackets,

vacuum-assist, electro-static force, adhesive on the touchpad surface, or an overlay with selective openings.

The above objects are realized in a specific illustrative embodiment of a system and method for providing visual feedback to the user when writing information that is to be digitally recorded, typically at a point of purchase, so that the writer can provide a signature that will generally appear to be the same as a signature that is not being digitized.

In a first aspect of the invention, carbonless paper is provided for the user to write a signature, where the signature is written on top of a touch-sensitive surface of a touchpad, a digitizing tablet or a digitizing pad.

In a second aspect of the invention, a non-inking stylus can be used with the carbonless paper because it will provide the desired visual feedback. The non-inking stylus eliminates the cost of providing an expensive inking stylus.

In a third aspect of the invention, an inking stylus can also be used, with or without the carbonless paper.

In a fourth aspect of the invention, a larger variety of touchpads and styluses can be used because the

stylus does not have to be the inking variety. Instead, the carbonless paper gives visual feedback to the writer who can use any type of stylus and touchpad because the system operates on the principle of applied pressure on the carbonless paper.

In a fifth aspect of the invention, an adhesive or other means of temporarily securing the carbonless paper while information is being written is provided.

These and other objects, features, advantages and alternative aspects of the present invention will become apparent to those skilled in the art from a consideration of the following detailed description taken in combination with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective elevational view of a tablet having a pressure sensitive digitizing area that does not provide visual feedback to the user while a signature is written.

Figure 2 is a perspective elevational view of a digitizing pad for recording signatures made on a credit card invoice.

Figure 3 is perspective elevational view of the presently preferred embodiment that is made in accordance with the principles of invention.

Figure 4 is side profile elevational view of an alternative embodiment of the present invention.

Figure 5 is a block diagram of the elements of a touchpad that is utilized in the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made to the drawings in which the various elements of the present invention will be given numerical designations and in which the invention will be discussed so as to enable one skilled in the art to make and use the invention. It is to be understood that the following description is only exemplary of the principles of the present invention, and should not be viewed as narrowing the claims which follow.

The present invention provides a system for giving a user visual feedback when writing information that is to be digitally recorded, and yet will work with an inking or a non-inking stylus. But what should be remembered is

that while the system requires pressure to be applied by the user who is writing information, the digitizing technology does not have to be pressure sensitive.

Accordingly, the presently preferred embodiment of the invention is a combination of three elements as shown in figure 3. The first element is a touchpad 30 or other device that is capable of digitizing information that is applied to a touch-sensitive surface 32. The second element is a non-inking stylus 34. And finally, the third element is carbonless paper 36. Carbonless paper is paper on which a visible mark appears wherever an object makes a contact therewith, such as from a point of a stylus. For example, it is often used to make duplicate checks. The writing on a check above makes a clearly distinguishable impression on the carbonless paper below.

The preferred embodiment operates on the principle of the stylus 34 applying pressure on a touch-sensitive surface 32. Because this principle of operation is universal to most if not all varieties of touchpads, digitizing tablets and non-inking styluses, the present invention eliminates the need to provide a stylus with an

inking cartridge. Such a modification to a stylus can raise the cost substantially. Furthermore, using an inking stylus will inevitably lead to the touchpad surface becoming dirty and perhaps permanently marked with ink.

Accordingly, the present invention eliminates the need for an inking cartridge by using the carbonless paper 36 that can be secured by any convenient means to the touchpad 30.

A first important observation is that the touchpad 30 can use any type of sensing technology. For example, this means that the touchpad can use capacitance sensing, electromagnetic, inductive, pressure sensing, electrostatic, ultrasonic, optical, resistive membrane, semi-conductive membrane or other finger or stylus-responsive technology. All that is important is that the user must need to apply pressure to the touch-sensitive surface in order for the touchpad to receive input. As long as the user must apply pressure, the present invention provides visual feedback.

The visual feedback is provided in the form of the carbonless paper 36. Carbonless paper 36 produces a

visible indication of where pressure is applied. Therefore, regardless of what type of information is being written, it will appear on the carbonless paper 36.

The carbonless paper 36 can be provided in the form of a receipt, an invoice, a form, or even as a blank sheet. However, it is important that the carbonless paper 36 not move while the user is writing. Even though the information on the carbonless paper 36 will look correct, the digitized recording might show information written on top of other information. Therefore, it is another aspect of the invention that a means be provided for securing the carbonless paper 36 while information is written thereon.

For example, a very light adhesive might be applied to an underside of the carbonless paper 36. The light adhesive might have nothing more than a tacky feeling, such as is found on sticky notes that are ubiquitous in offices. The adhesive can be along the entire backside of the carbonless paper 36, or be used in just a few locations such as along an edge or at the corners.

Figure 4 shows in a profile view that another option is to provide some sort of clip 40 or bracket along an

edge of a touchpad 42. The clip 40 might be nothing more than a clip that is found on common clipboards. The clip would most likely not make contact with a touch-sensitive surface 44, but instead be disposed above it so as not to interfere with the information being recorded in digital format.

The stylus 34 of the present invention can operate in many different ways. Essentially, what is important is that the stylus function with the type of touch-sensitive technology that the touchpad is using. Thus, the present invention will work with any type of stylus. As a means of reducing costs of the system, the stylus can be the non-inking variety because carbonless paper 36 is preferred. Nevertheless, the present invention will still function with an inking stylus, even if carbonless paper 36 is being used. It should be noted that the stylus can be the type that must be tethered to the touchpad to function.

The touchpad 30 of the present invention must also have the capability of digitizing information. Thus, it is not enough that the touchpad can function as an input device to a computer. It must be capable of digitizing

information that is disposed on the touch-sensitive surface. The touchpad must also have input regarding a time to begin and end recording of the information to be digitized. This feature is available in many existing touchpad system. For example, the Cirque Corporation CRUISE CAT(TM) or the INDELeLINK INDELePAD(TM). These touchpads are capable of recognizing gestures. This gesture recording technology is easily adapted to recording information beginning at a designated time period, and ending at a designated time period. For the sake of comparison, it is noted that an example of digitizer tablet technology that could be used is a Super Pen Tablet, model SP3333 from UC-LOGIC.

Alternative embodiments of the invention include such things as the different types of carbonless paper and pressure sensitive paper that are available. For example, some carbonless paper is a single sheet. Other carbonless paper consists of two sheets, and it is the interaction between them that results in one of the sheets showing an imprint of a stylus thereon.

It was mentioned previously that the stylus can be inking or non-inking. The stylus can also be an active

device or a passive device. For example, an inductive stylus, radio frequency (RF) stylus, infra red (IR) stylus, and sonic stylus are all active devices.

Attaching the carbonless paper to the touchpad surface has previously been described as using a light adhesive or a clip. Other means of temporary attachment include vacuum assist, electro-static force, or an adhesive surface on the touchpad rather than on the carbonless paper. Another possibility is the use of a plastic overlay. The paper is inserted between the plastic overlay and the touch-sensitive surface of the touchpad. The stylus makes contact with the plastic overlay while the paper is held in place. The plastic overlay would have holes in it where the stylus would make direct contact with the paper.

The carbonless paper has previously been described as being a single or double sheet. However, the carbonless paper can also come in a roll such as is common for adding machines.

Another feature of the present invention is the ability to manage the digitized data once it is recorded. For example, it may be necessary to at least temporarily

store the digitized data. Thus, figure 5 illustrates the concept that the touchpad 50 can include non-volatile memory, RAM, or even a hard drive as memory 52. However, it may be desirable to transfer the data to another device for long term storage or evaluation. Therefore, the touchpad can also include a communication port 54 to link it to another device. The communication port 54 might just be a wire to a computer, or be a wireless link such as is provided by infra-red or radio frequency technology. Furthermore, even if the digitized data is eventually transferred to another location, the touchpad might have to at least temporarily store the digitized data until transfer can take place. Thus, the touchpad can include the memory and a communication port. It is understood that the sensing technology 56 and the digitizing technology 58 are a part of the touchpad 50.

It is to be understood that the above-described arrangements are only illustrative of the application of the principles of the present invention. Numerous modifications and alternative arrangements may be devised by those skilled in the art without departing from the spirit and scope of the present invention. The appended

claims are intended to cover such modifications and arrangements.

CLAIMS

What is claimed is:

1. A system for providing visual feedback when writing data that is recorded in a digital format, said system comprising:

a digitizing device that includes a surface that is responsive to an input device;

a stylus whose movement is detectable on the surface of the digitizing device; and

at least one sheet of carbonless paper, wherein at least a portion of the at least one sheet of carbonless paper is disposed on the surface in a writing area, wherein the stylus enters data by making contact with the carbonless paper in the writing area, and wherein the data is digitized by the digitizing device.

2. The system as defined in claim 1 wherein the digitizing device further comprises a memory for recording the digitized data.

3. The system as defined in claim 1 wherein the system

further comprises a communication port to thereby enable the digitized data to be transferred to another location.

4. The system as defined in claim 3 wherein the communication port can include wire and wireless technology to accomplish the transfer of the digitized data.

5. The system as defined in claim 1 wherein the surface of the digitizing device is selected from the group of surface sensing technologies consisting of capacitance, electromagnetic, inductive, pressure, electrostatic, ultrasonic, optical, resistive membrane, and semi-conductive membrane sensing technologies.

6. The system as defined in claim 1 wherein the stylus is comprised of a non-inking stylus that is detectable by the responsive surface of the digitizing device.

7. The system as defined in claim 1 wherein the stylus is selected from the group of styluses consisting of active and passive styluses.

8. The system as defined in claim 7 wherein the active styluses are selected from the group of active styluses consisting of inductive, radio frequency (RF), infra-red, and sonic styluses.

9. The system as defined in claim 1 wherein the system further comprises a means for temporarily holding the at least one sheet of carbonless paper on the responsive surface of the digitizing device.

10. The system as defined in claim 9 wherein the means for temporarily holding the at least one sheet of carbonless paper on the responsive surface of the digitizing device is selected from the group of means consisting of slots, brackets, clips, vacuum-assists, electrostatic forces, overlays, and adhesives.

11. The system as defined in claim 10 wherein the overlay further comprises at least one hole therethrough to thereby enable a stylus to make direct contact with the at least one sheet of carbonless paper to thereby make a visible impression thereon.

12. The system as defined in claim 1 wherein the at least one sheet of carbonless paper is further comprised of a form with at least one predefined area where a stylus is to make contact and provide desired information.

13. The system as defined in claim 1 wherein the carbonless paper is further comprised of a plurality of sheets, wherein an interaction between the plurality of sheets of carbonless paper results in a visible impression on at least one of the plurality of sheets.

14. The system as defined in claim 1 wherein the at least one sheet of carbonless paper is further comprised of a roll of carbonless paper, such that the carbonless paper can be pulled from the roll and removed therefrom in desired increments.

15. The system as defined in claim 1 wherein the at least one sheet of carbonless paper is further comprised of an adhesive which enables the at least one sheet of

carbonless paper to adhere to the responsive surface of the digitizing device.

16. The system as defined in claim 15 wherein the at least one sheet of carbonless paper is further comprised of the adhesive which is disposed thereon in selected locations.

17. A method for receiving visual feedback when writing on a digitizing device that can record the writing thereon, wherein the method comprises the steps of:

(1) providing the digitizing device that includes a surface that is responsive to an input device, a stylus whose movement is detectable on the responsive surface, and at least one sheet of carbonless paper, wherein at least a portion of the at least one sheet of carbonless paper is disposed on the responsive surface in a writing area; and

(2) writing on the at least one sheet of carbonless paper in the writing area using the stylus while the writing is recorded.

18. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper regardless of a sensing technology utilized by the digitizing device.

19. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper regardless of a type of stylus technology utilized in the stylus.

20. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper without damaging the responsive surface by utilizing a non-inking stylus.

21. The method as defined in claim 17 wherein the method further comprises the step of utilizing the digitizing device to also provide input to a computer that is

coupled thereto, wherein the input at least comprises cursor control.

22. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper while avoiding the expense of utilizing an inking stylus.

23. The method as defined in claim 17 wherein the method further comprises the step of receiving visual feedback from the at least one sheet of carbonless paper without having to risk writing with ink on the responsive surface.

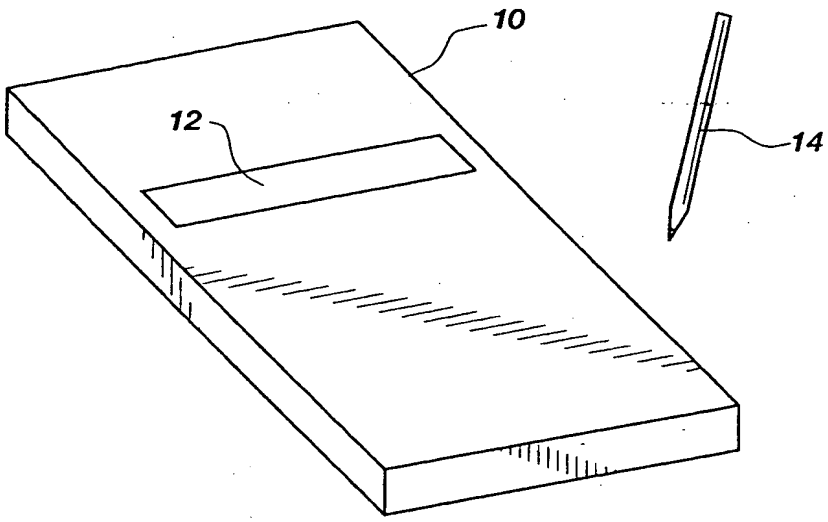

Fig. 1
(PRIOR ART)

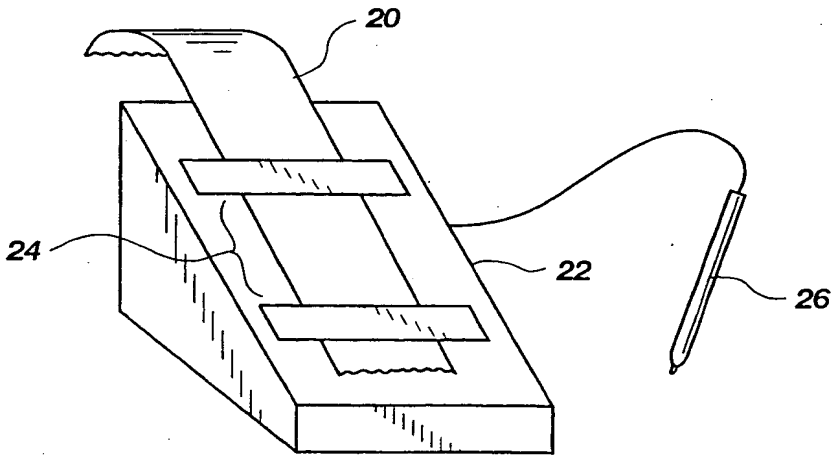

Fig. 2
(PRIOR ART)

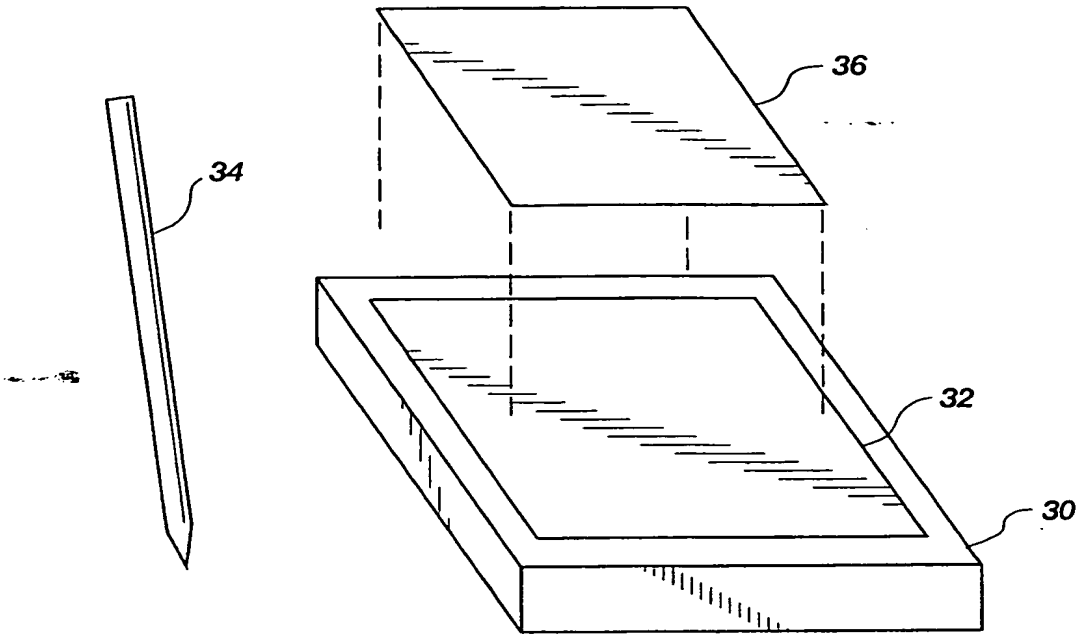

Fig. 3

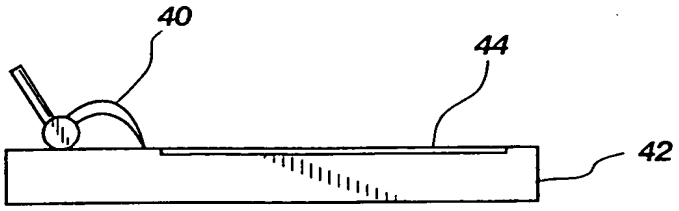

Fig. 4

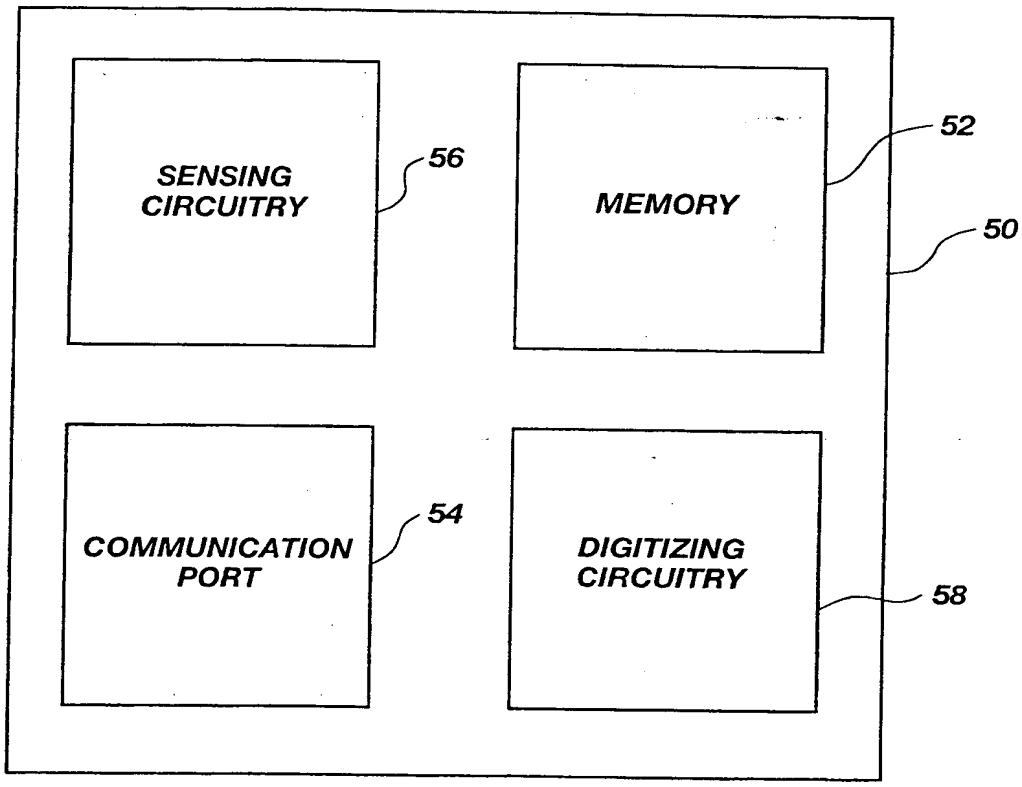

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/14653

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06K 9/22, 9/00, 5/00
US CL : 382/313, 119; 235/380

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 382/313, 314, 315, 119; 235/380, 472; 283/60.1, 60.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST (USPAT, USOCR, EPO, JPO, Derwent)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,561,282 A [PRICE et al] 01 October 1996, abstract, Figs. 1, 2A, 8, col. 12, line 44 to col. 13, line 65, col. 18, lines 33-45, col. 19, lines 19-44, col. 30, lines 8-23.	1-23
Y	US 5,819,665 A [MCCORMICK] 13 October 1998, col. 4, line 66 to col. 5, line 15, col. 6. lines 12-28.	1-23
Y	US 5,756,187 A [KUO et al] 26 May 1998, col. 3, lines 19-41, col. 4, lines 1-6.	15-16
Y	US 4,318,096 A [THORNBURG et al] 02 March 1982, col. 1, lines 8-23.	21
Y	US 4,005,878 A [VAN LEER] 01 February 1977, col. 3, lines 59-68.	1-23

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 28 JULY 2000	Date of mailing of the international search report 14 AUG 2000
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